



EXPRESS MAIL NO. EV449559330US

Sheet 1 of 5

FORM PTO-1449  
(REV. 7-80)U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICEINFORMATION DISCLOSURE STATEMENT  
(Use several sheets if necessary)

ATTY. DOCKET NO.

690116.401C1

APPLICATION NO.

10/810,486

APPLICANT

Mitsuru Furusawa

FILING DATE

March 26, 2004

GROUP ART UNIT

1642 1633

## U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
AA						

## FOREIGN PATENT DOCUMENTS

DOCUMENT NUMBER	DATE	COUNTRY	TRANSLATION
AB			YES NO

## OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)

MB	AC	Aoki, K. et al., "Promotion of Evolution by Intracellular Coexistence of Mutator and Normal DNA Polymerases," <i>J. Theor. Biol.</i> 209:213-222, 2001.
MB	AD	Araki, H. et al., "Cloning DPB3, the Gene Encoding the Third Subunit of DNA Polymerase II of <i>Saccharomyces Cerevisiae</i> ," <i>Nucleic Acids Research</i> 19(18):4867-4872, 1991.
MB	AE	Boulet, A. et al., "Structure and Function of the <i>Saccharomyces Cerevisiae</i> CDC2 Gene Encoding the Large Subunit of DNA Polymerase III," <i>The EMBO Journal</i> 8(6):1849-1854, 1989.
MB	AF	Doi, H. et al., "Evolution is Promoted by Asymmetrical Mutations in DNA Replication - Genetic Algorithm with Double-Stranded DNA -," <i>Fujitsu Sci. Tech.</i> 32(2):248-255, December 1996.
MB	AG	Eigen, M., "Selforganization of Matter and the Evolution of Biological Macromolecules," <i>Die Naturwissenschaften</i> 58:465-523, 1971.
MB	AH	Eigen, M., "The Hypercycle. A Principle of Natural Self-Organization," <i>Die Naturwissenschaften</i> 64:541-565, 1977.
MB	AI	Eshleman, J. et al., "Increased Mutation Rate at the <i>hprt</i> Locus Accompanies Microsatellite Instability in Colon Cancer," <i>Oncogene</i> 10:33-37, 1995.
MB	AJ	Fancino, P. et al., "Asymmetries Generated by Transcription-Coupled Repair in Enterobacterial Genes," <i>Science</i> 272:107-112, 1996.
MB	AK	Furusawa, M. et al., "Promotion of Evolution: Disparity in the Frequency of Strand-Specific Misreading Between the Lagging and Leading DNA Strands Enhances Disproportionate Accumulation of Mutations," <i>J. Theor. Biol.</i> 157:127-133, 1992.
MB	AL	Furusawa, M. et al., "Asymmetrical DNA Replication Promotes Evolution: Disparity Theory of Evolution," <i>Genetica</i> 102/103:333-347, 1998.

EXAMINER

/Michael Burkhart/

DATE CONSIDERED

08/18/2006

\* EXAMINER: Initial if reference considered, whether or not criteria is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant(s).

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				YES NO			
BB							
<b>OTHER PRIOR ART</b> (Including Author, Title, Date, Pertinent Pages, Etc.)							
MB	BC	Fijalkowska, I. et al., "Unequal Fidelity of Leading Strand and Lagging Strand DNA Replication on the <i>Escherichia Coli</i> Chromosome," <i>Proc. Natl. Acad. Sci. USA</i> 95:10020-10025, August 1998.					
MB	BD	Gawel, D. et al., "Asymmetry of Frameshift Mutagenesis During Leading and Lagging-Strand Replication in <i>Escherichia Coli</i> ," <i>Mutation Research</i> 501:129-136, 2002.					
MB	BE	Goldsby, R. et al., "High Incidence of Epithelial Cancers in Mice Deficient for DNA Polymerase $\delta$ Proofreading," <i>Proc. Natl. Acad. Sci.</i> 99(24):15560-15565, November 2002.					
MB	BF	Iwaki, T. et al., "Preferential Replication-Dependent Mutagenesis in the Lagging DNA Strand in <i>Escherichia Coli</i> ," <i>Mol. Gen. Genet.</i> 251:657-664, 1996.					
MB	BG	Kang, S. et al., "Expansion and Deletion of CTG Repeats form Human Disease Genes are Determined by the Direction of Replication in <i>E. Coli</i> ," <i>Nature Genetics</i> 10, 213-218, June 1995.					
MB	BH	Kunkel, T. et al., "Exonucleolytic Proofreading by Calf Thymus DNA Polymerase $\delta$ ," <i>Proc. Natl. Acad. Sci. USA</i> 84:4865-4869, July 1987.					
MB	BI	Maliszewska-Tkaczyk, M. et al., "SOS Mutator Activity: Unequal Mutagenesis on Leading and Lagging Strands," <i>Proc. Natl. Acad. Sci. USA</i> 97(23):12678-12683, November 2000.					
MB	BJ	Morrison, A. et al., "The 3' $\rightarrow$ 5' Exonucleases of Both DNA Polymerase $\delta$ and $\epsilon$ Participate in Correcting Errors of DNA Replication in <i>Saccharomyces Cerevisiae</i> ," <i>Mol. Gen. Genet.</i> 242:289-296, 1994.					
MB	BK	Morrison, A. et al., "A Third Essential DNA Polymerase in <i>S. Cerevisiae</i> ," <i>Cell</i> 62:1143-1151, September 1990.					
MB	BL	Ohya, T. et al., "Structure and Function of the Fourth Subunit(Dpb4p) of DNA Polymerase $\epsilon$ in <i>Saccharomyces Cerevisiae</i> ," <i>Nucleic Acids Research</i> 28(20):3846-3852, 2000.					
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CA							
<b>FOREIGN PATENT DOCUMENTS</b>							
	DOCUMENT NUMBER	DATE	COUNTRY			TRANSLATION	
						YES NO	
CB							
<b>OTHER PRIOR ART</b> (Including Author, Title, Date, Pertinent Pages, Etc.)							
MB	CC	Roberts, J. et al., "Fidelity of a Human Cell DNA Replication Complex," <i>Proc. Natl. Acad. Sci. USA</i> 85:7064-7068, October 1988.					
MB	CD	Robert, J. et al., "Frameshift Fidelity During Replication of Double-Stranded DNA in HeLa Cell Extracts," <i>Biochemistry</i> 32:4083-4089, 1993.					
MB	CE	Robert, J. et al., "Exonucleolytic Proofreading of Leading and Lagging Strand DNA Replication Errors," <i>Proc. Natl. Acad. Sci. USA</i> 88:3465-3469, April 1991.					
MB	CF	Robert, J. et al., "Mispair-, Site-, and Strand-Specific Error Rates During Simian Virus 40 Origin-Dependent Replication <i>in Vitro</i> with Excess Deoxythymidine Triphosphate," <i>The Journal of Biological Chemistry</i> 269(3):1711-1717, January 1994.					
MB	CG	Rosche, W. et al., "Differential DNA Secondary Structure-Mediated Deletion Mutation in the Leading and Lagging Strands," <i>Journal of Bacteriology</i> 177(15):4385-4391, August 1995.					
MB	CH	Tanabe, K. et al., "A Conspicuous Adaptability to Antibiotics in the Escherichia Coli Mutator Strain, <i>DNAQ49</i> ," <i>FEMS Microbiology Letters</i> 176:191-196, 1999.					
MB	CI	Trinh, T. et al., "Preferential DNA Secondary Structure Mutagenesis in the Lagging Strand of Replication in E. Coli," <i>Nature</i> 352:544-547, August 1991.					
MB	CJ	Veaute, X. et al., "Greater Susceptibility to Mutations in Lagging Strand of DNA Replication in <i>Escherichia Coli</i> than in Leading Strand," <i>Science</i> 261:598-600, July 1993.					
MB	CK	Wada, K-N. et al., "A Neo-Darwinian Algorithm: Asymmetrical Mutations due to Semiconservative DNA-Type Replication Promote Evolution," <i>Proc. Natl. Acad. Sci. USA</i> 90:11934-11938, December 1993.					
MB	CL	Weston-Hafer, K. et al., "Deletions in Plasmid pBR322: Replication Slippage Involving Leading and Lagging Strands," <i>Genetics</i> 127:649-655, April 1991.					
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					YES	NO	
MB	DE	08-163986	06/25/96	JP (+ Abstract in English)			
MB	DF	08-163987	06/25/96	JP (+ Abstract in English)			
MB	DG	09-023882	01/28/97	JP (+ Abstract in English)			
MB	DH	WO 00/28015	05/18/00	WIPO			
MB	DI	1 054 057 A1	11/22/00	EP			
<b>OTHER PRIOR ART</b> (Including Author, Title, Date, Pertinent Pages, Etc.)							
MB	DJ	Wu, C-I. et al., "Inequality in Mutation Rates of the Two Strands of DNA," <i>Nature</i> 327:169-170, May 1987.					
	DK	Furusawa, M., <i>Iden</i> , pp. 148-158, July 1996.					
	DL	Furusawa, M., <i>Iden</i> 8:92-96, March 2001.					
	DM	Furusawa, M., "Asymmetrical DNA Replication Promotes Evolution," <i>Pathological Physiology</i> 14:675-681, September 1995.					
	DN	Furusawa, M., <i>KAST Report</i> 7(1):20-25, 1995.					
	DO	Furusawa, M., <i>BioHistory</i> , pp. 012-013, November 2001.					
	DP	Furusawa, M., <i>Chemistry and Biology</i> 34(2):78-79, 1996.					
MB	DQ	Barnes, M., et al., "Localization of the Exonuclease and Polymerase Domains of <i>Bacillus subtilis</i> DNA Polymerase III," <i>Gene</i> 111:43-49, 1992.					
MB	DR	Horst, J-P., et al., " <i>Escherichia coli</i> Mutator Genes," <i>Trends in Microbiology</i> 7(1):29-36, January 1999.					
	DS	Maki, H., "Natural Mutation and Repair Mechanism," <i>Cell Engineering</i> 13(8):663-672, 1994.					
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	EJ						

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					YES	NO
	EK					
	EL					
	EM					
	EN					
	EO					

## OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)

MB	EP	Morrison, A., et al., "Pathway Correcting DNA Replication Errors in <i>Saccharomyces cerevisiae</i> ," <i>EMBO J.</i> 12(4):1467-73, April 1993.
MB	EQ	Stemmer, W., "Rapid Evolution of a Protein <i>in vitro</i> by DNA Shuffling," <i>Nature</i> 370(6488):389-91, August 4, 1994.
	ER	

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